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Anthropogenic suffering of farmed animals: the other side of zoonoses

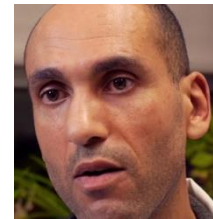
Commentary on [Wiebers & Feigin](#) on *Covid Crisis*

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Abstract: Wiebers & Feigin's (W&F's) target article warns of the zoonotic threat to human health from factory farming and urges phasing out meat production and consumption, for the benefit of both human and nonhuman animals. This commentary focuses on the physical and emotional suffering of farmed animals. This varies by species, production system and geographic location, but suffering is there throughout all stages of production — breeding, housing, transport, usage and slaughter. Ubiquitous monitoring of all facilities where farmed animals are kept, with surveillance cameras recording all phases of production would help reduce some forms of suffering. Other forms are caused by accidents, disease outbreaks and all the “collateral damage” from factory farming. Nor can efforts to improve the welfare of farmed animals be confined to “merely” minimizing their suffering. Their lives need to be made not just bearable but worth living too. It is unrealistic to imagine, however, that all the suffering inflicted on farmed animals by industrial practices and human callousness can be eliminated by efforts to improve their welfare: Welfare measures urgently need to be undertaken and promoted, but they must not be regarded complacently, as if they were a panacea. A panacea would be to phase out animal production, as W&F have proposed, under the imminent zoonotic threat of COVID-19 and its successors.

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1. Introduction. Wiebers & Feigin (2020a,b) (W&F) point out that what COVID-19 is telling humanity is that the principal cause of present and future pandemics is zoonotic – human contact with nonhuman animals -- and that the principal solution is to phase out factory farming. W&F note further that, as a side-benefit, this will also phase out the principle cause of animal suffering. What animal suffering is caused by factory farming? This will be the subject of this commentary.

Sentience -- the capacity for suffering, physical as well as psychological, in most non-human animal species -- is no longer in serious dispute (Griffin 2013; Safina 2016; Kumar et al. 2019; Birch et al. 2020). The behavioral and neural evidence that most animals (including all farmed animals except perhaps the simplest invertebrates) are sentient is abundant: the growing number of empirical studies on animal suffering provide an incontrovertible response to anyone who would still question its existence (Dawkins 2012; Broom 2016; Peggs & Smart 2016; Ng 2016; Mellor 2016; Alonso et al. 2020). However, the true moral challenge facing our civilization may not reside in the recognition of animals' capacity for suffering; the major step that humanity must now take is to acknowledge that the exploitation of farmed animals is among the main causes of the suffering that human beings inflict on non-human animals (“anthropogenic suffering”).

The suffering of farmed animals in the production process varies in nature and intensity depending on the species, type of farming and geographic location. Overall, suffering may be experienced in one form or another starting at birth and continues through every stage of the production process up to slaughter. Not every form of suffering is necessarily experienced in all types of farmed animals but no mode of production is entirely free of it (Farm Animal Welfare Committee 2014).

The extent of animal suffering is often downplayed by ascribing responsibility to malevolent individuals whose sadistic behaviour falls outside the norm. However, the conscious and deliberate acts of cruelty by some workers in the industry that are periodic subjects of media reports are only one subset among the many causes of suffering in farmed animals; they are neither the sole nor even the main cause. Apart from cruel acts that are punishable by law (although the law is often lenient or laxly enforced), farmed animals endure many kinds of physical and psychological suffering caused not by malicious acts but simply by standard industry practices. In a farm environment, the bulk of animal suffering is systemic (Eaton 2018; Peggs 2018). In addition to direct suffering, there is suffering that may be considered the animal production industry's collateral damage, as caused by accidents (e.g. traffic accidents, shipwrecks, farm fires; Moyer 2019) or epidemics (which lead to entire herds or flocks being put to death under suboptimal conditions; O'Sullivan 2020) or animal sports (such as rodeos [Kona-Boun 2018a,b], pig-wrestling, and poultry scrambles [Minnesota Statute 2019]). Collateral damage of this type must also be included in the catalogue of misery that is part and parcel of the animal production industry (Hodges 2003; Aerts & de Tavernier 2016).

Animal welfare policies, which vary by jurisdiction (Blattner 2019; Vogeler 2019), aim to regulate intentional mutilating practices (such as castration, tail-docking, beak trimming, de-horning) that are common in animal production, as well as to outlaw and punish illicit malicious acts. Although such policies indisputably represent some progress on the animal cruelty front, it must be borne in mind that mutilation and malicious acts are far from the only causes of the suffering endured by farmed animals (EU Directive 1999; see below).

2. Physical suffering of farmed animals. A primary form of physical suffering inflicted on farmed animals is pain. The International Association for the Study of Pain (IASP) defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Raja et al. 2020). The emotional component of pain, which is so central to our understanding of it, has led some to challenge the applicability of this definition, originally framed for humans, to animals, on the grounds that it is not certain that animals can feel emotions, or at least not to the same degree as human beings. It has therefore been suggested that the terms “nociception” and “antinociception” are more appropriate than “pain” and “analgesia” (from the Greek *an* + *algos*, meaning “absence of pain”) (Riedel et al. 2001; cf. Morris 2016; Aydede 2019).

Manfred Zimmermann (1986), an internationally respected expert on the neurobiology of pain, had formulated a definition of pain adapted to animals, based on physiological and behavioural characteristics: “An aversive sensory experience caused by actual or potential injury that elicits protective and vegetative reactions, results in learned behaviour, and may modify species specific behaviour” (Zimmermann 2005; Sneddon et al. 2018). It is now generally accepted that the animal species commonly found on farms demonstrate behaviours that

strongly suggest the existence of emotions, whether or not they are identical to those felt by human beings. In any event, even by the most rudimentary definition, pain is at least “an aversive sensory experience.” To quote the British philosopher Jeremy Bentham (1789), “The question is not, Can they reason? nor Can they talk? but, Can they suffer?” Whether animals can think is not what is at stake: the critical question is whether they can suffer, and the answer is plainly “yes.” We are hence under a moral obligation to alleviate, and ideally to prevent, pain and suffering in farmed animals.

Physical suffering in farmed animals may start at birth or infancy, being sometimes associated with neonatal or infant mortality caused by human beings or by disease (Mellor & Stafford 2004; Homedes et al. 2014). In the case of egg production, for example, the brutal destruction of male chicks, who serve no economic purpose, is a sad part of the poultry industry (Aerts et al. 2009). Newborn chicks are ground up alive or stuffed into bags to die of suffocation. Male chicks are equally useless to factory farms and to the increasingly rare traditional farms (which can no longer keep up with demand from the burgeoning human population). The death of countless male chicks is therefore a feature of all egg production, regardless of type. Ultimately, the hens too meet a grim fate at the slaughterhouse once they reach the end of their short productive lives, completely spent, after a brief existence of induced laying at an unnaturally accelerated rate (Aerts et al. 2016).

On dairy farms, male cattle are sent to the slaughterhouse at a young age, after being separated from their mothers within hours or days after birth and then often confined for the whole of their brief lives, which do not extend beyond calfhood (Ventura et al. 2013; Tulloch & Judge 2018; Placzek et al. 2020; Mikuš & Mikuš 2020). Females survive for several years (far less than their normal lifespan) during which they are repeatedly inseminated to gestate and give birth in order to produce enormous quantities of milk from their oversized mammary glands, the result of human manipulation designed to increase production beyond natural limits (Lehenbauer & Oltjen 1998; Dobson et al. 2007; Sumner-Thompson et al. 2011; Ayadi 2019). Like the laying hens, dairy cows end their days at the slaughterhouse when their output falls off, as did their male calves and male siblings a few years earlier. Contrary to popular belief, eggs and milk are, just like meat, inextricably associated with inescapable suffering during the production process and ultimately the slaughter of the producing animals (Bellamy 2017; Kolbe 2018; Sanchez-Hidalgo et al. 2019; Clay et al. 2020).

Many farmed animals are also subjected to various types of mutilation, often performed without anaesthetic, sometimes in the first days of their lives (Levine et al. 2005, Janczak & Riber 2015, Herskin et al. 2016, Canozzi et al. 2018). These mutilations -- including the removal of beaks, teeth, testicles, tails, horns, branding -- cause acute, sometimes intense, pain and can also lead to chronic pain (Breward & Gentle 1985; Mellor et al. 2000; Angevaere et al. 2012; Nordquist et al. 2017; Casoni et al. 2019). The rationale offered for many of these practices is that they serve to protect animals against themselves and prevent the greater suffering that would otherwise arise from wounding one another. This justification, however, ignores the true source of the problem: in reality, these mutilations serve primarily to protect animals from the harmful effects of farming systems that are far removed from their natural living conditions and therefore prompt maladaptive behaviours that can result in injury (as further discussed below).

Genetic selection is used to generate greater muscle mass and body weight, and to do so at an ever-faster pace. These genetic manipulations can result in abnormalities and anatomical

distortions, giving rise to often-painful pathologies: articular and skeletal problems such as bone deformities, pathological fractures and osteoarthritis (Gamborg & Sandøe 2003; Bizeray et al. 2004; Shields et al. 2013; Funahashi 2020). In the case of turkeys, for example (Erasmus 2018), the enormous muscle mass and rapid growth promoted by genetic selection cause serious skeletal problems that can result in pathological fractures; the birds suffer from bone deformities and are sometimes unable to support their excessive weight or even to move (Sullivan 1994, Zampiga et al. 2020). Balance and mobility are further handicapped by the common practice of amputating the turkeys' distal toe joints to reduce injuries caused by the birds' sturdy claws (Fournier et al. 2015). Similarly, in broiler chickens (European Commission 2016, Dinev et al. 2019, Hartcher & Lum 2020), unnaturally rapid growth and excessive muscle mass can cause pathologies including tibial dyschondroplasia and vertebral abnormalities such as spondylolisthesis, which are associated with neurological disorders (paresis, paralysis) and angular deformities of the feet (valgus, varus) (Makrai et al. 2011, Aitchison et al. 2014, Jung et al. 2018, Huang et al. 2019, Guo et al. 2019). Genetic abnormalities (Dierick et al. 2019) also cause pathologies at sites other than the arthro-skeletal system, notably hypertrophic cardiomyopathy (in both chickens and turkeys, due to too-rapid growth, high metabolic rate and excessive stress), which can lead to sudden death (Chen et al. 2017; Olkowski et al. 2020). Obstetrical problems resulting from fetopelvic disproportion occur in some species of beef cows with artificially exaggerated muscle mass, who cannot give birth naturally and must always deliver their calves, too large to pass through the pelvic canal, by caesarian section (Greger 2010; Waldner 2014; Pearson et al. 2019). And the list goes on.

Transport (often the only time in their lives when animals get a brief taste of the outdoors) may be carried out under extreme conditions of heat or cold, sometimes over prolonged periods and long distances, notwithstanding animal welfare standards (which vary from country to country and are not always enforced because of a shortage of inspectors; Webster 2001; Nalon & Stevenson 2019; Morton et al. 2020). This often highly stressful period is also associated with physical suffering, including pain, in many cases (Elrom 2000a,b; Zanardi et al. 2007; Mitchell et al. 2009; White et al. 2009; Minka et al. 2010; Foster et al. 2014; Santurtun et al. 2015; Roy et al. 2015; Marques et al. 2016; Gaia-Eurogroup for Animals 2016; Vecerkova et al. 2019, Broom 2019). The causal factors include inadequate handling (arising from cruelty or poorly trained handlers) that can cause injuries (such as fractures in birds), the cramming of animals into transport cages or vehicles, extreme temperatures that can cause death (from hyperthermia or freezing), deprivation of food and water, and fatigue. It is not unusual for the examination of live animals at the slaughterhouse intake or of carcasses to reveal skin lesions, muscle damage or bone injuries such as contusions, hematomas, abrasions, lacerations, fractures, etc. (Bottacini et al. 2018; Dahl-Pederson et al. 2018a,b; Vecerek et al. 2019, 2010). Moreover, a non-negligible number of animals (varying by species) arrive dead (Schwartzkopf-Genswein et al. 2012, Phillips & Santurtun 2013).

Slaughter is the fate that awaits not only animals farmed specifically for meat but also animals used for their eggs or milk, who likewise end up at the slaughterhouse at the end of their productive lives. Animals are also slaughtered for reasons other than food, such as their fur (Mason et al. 2001). While slaughter is only one of the many stages of animal suffering (Veterinary Record (editorial) 2016), it is invariably the end of the road for the animals, regardless of farm type. Animals from traditional and factory farms, "organic" and standard farms, are all dispatched

to the same slaughterhouses (Duval et al. 2020). In no type of slaughter (ritual or secular) is absence of physical suffering assured (Browning & Veit; 2020).

Slaughter has nothing in common with euthanasia (from the Greek *eu* + *thanatos*, meaning “good death”), which implies a fast, gentle death without psychological stress or pain (or “as little as possible” -- a qualification that risks opening the door to a variety of interpretations that are not always in the animals’ interest) (Kona-Boun 2005). Significant numbers of animals are likely to experience both physical and psychological suffering at slaughter, either because of the conveyance system used at the facility (e.g., fully conscious chickens suspended by the feet on hooks attached to a rail and carried upside-down to the stunning station) or because of the killing method itself. Current slaughtering techniques do not always kill or render the animal unconscious at the first attempt. Animals have been observed struggling in the vat of hot water or while being cut up (Shields & Raj 2011; Cranley 2017; EFSA Panel on Animal Health and Welfare 2019, 2020; Sanchez-Hidalgo et al. 2019). It is impossible to guarantee the absence of physical and psychological suffering during the process, for they are concomitant with high-speed, automated slaughter (Eaton 2018; Grandin 2020; Browning & Veit 2020). Given the speed of the slaughter lines, the process of putting animals to death cannot be individualized, in contrast with the death of a family companion animal, which is handled with care and for whom the cessation of vital functions is confirmed before the body is abandoned. Even the basest criminals sentenced to death are entitled to similar treatment. It is therefore legitimate to ask why things should be so different for farmed animals.

We can also ask why it is considered morally justifiable to sentence animals to death at all, but that is another debate. Clearly, part of the explanation lies in the consumer appetite for chicken legs and bacon, and the increase in meat consumption from burgeoning numbers of consumers (Hestermann et al. 2020). Unmonitored slaughter, with no verification that vital functions have ceased, is unconscionable in view of what comes next. Yet an individualized system would not be economically viable: it would greatly diminish productivity, drive up the already subsidized price of meat and reduce output (Grandin 2020; Broeks et al. 2020). This illustrates the inherent contradiction between animal welfare and financial considerations throughout the production process (Dawkins 2017; Hristov et al. 2019). The trade-off makes it impossible for the animal production industry to operate without causing physical and psychological suffering to the vast number of animals killed every day (Fernández-Mateo & Franco-Barrera 2020; Zampa 2020).

3. Psychological suffering of farmed animals. The suffering of farmed animals is a multidimensional sensory and emotional experience that is by no means confined to physical sensations such as pain. Underestimating the impact of psychological suffering is a common error. When psychological suffering reaches an unbearable level, it is expressed in maladaptive behaviours (e.g. stereotypy, displacement behaviors, aggression, learned helplessness) that clearly indicate that the individual’s well-being has been seriously compromised (Gunnarsson et al. 1999; Tatemoto et al. 2018; Vice 2019).

The principal forms of psychological suffering that have been studied in animals are discomfort, fear, deprivation, frustration (caused, for example, by inability to express natural behaviours in an artificial environment) and conflictual situations (Reed et al. 1993; Swanson 1995; Duncan 2004; Proudfoot, K., & Habing, G. 2015; McMillan 2019). It is also reported that

some species are capable of experiencing other forms of psychological suffering, such as loneliness, sadness and boredom (Meagher 2018; Nawroth et al. 2019; Cooper & Wemelsfelder 2020). However, the psychological component of suffering in animals is often underestimated or ignored altogether. This obliviousness is sustained by the general inability to recognize behavioural signs of psychological distress in animals, which vary between species (Dantzer & Mormède 1983; Mason 2010; Romero & Gormally 2019; Flores-Peinado et al. 2020; Neethirian 2020; Martínez-Miró et al. 2016). Another cause is the still widespread misconception that animals are not sentient beings endowed with emotions and the ability to feel pleasure or to suffer physically and psychologically (Allen & Bekoff 2007; Griffin 2013; Proctor et al. 2013; Birch 2017; Sneddon et al. 2018).

Psychological distress in the form of anxiety, fear, boredom, frustration or other mental states may lead to abnormal behaviour with deleterious results. One major and frequent source of psychological suffering is severe confinement, which prevents the expression of natural behaviours, some of which are powerful motivators (Moberg 2000, HSUS 2011, Mason et al. 2001; Shields & Greger 2013; Kumar et al. 2019; Kull et al. 2019; Mee & Boyle 2020). Confinement can also cause physical suffering when animals are unable to assume a comfortable position or are subjected to prolonged inappropriate mechanical pressure to sensitive body sites. Extreme examples of confinement systems include battery cages for laying hens, gestation crates for sows, wire cages for foxes and mink on fur farms, robotic milking installations for cows, and veal crates (Shields & Duncan 2009; Madzingira 2018; Lascelles 2019). All these devices are associated with lack of exercise and usually lack of exposure to the outdoors, aggravating the deleterious effects. The psychological stress generated by confinement, boredom and frustration can cause maladaptive, compulsive, stereotypical behaviours, which may result in self-inflicted injury or harm to other animals (Humane Society of the United States 2011).

Public pressure has been prompting growing numbers of farms to limit the intensity and duration of some types of confinement (Cornish et al. 2016; Alonzo et al. 2020), but this pernicious feature of factory farming remains widespread. Free-range farms (Mickelson 2016) make up a negligible proportion of animal-based food product sources and are very far from being able to meet the current demand from the steadily growing human population. Nor can they ensure the elimination of all the other forms of animal suffering prevalent in the industry (Hristov et al. 2019). Even when the confinement is not too narrow cages, the overcrowding, absence of fresh air and natural sunlight, lack of outdoor access and the inability to express natural behaviors continue to cause suffering (Mellor 2019).

Psychological stress can also cause gastric erosions or ulcers in some species, or immunodepression, leaving animals more vulnerable to infection by the pathogenic micro-organisms that occur in high concentrations in the crowded, confined environments common in the industry (Chmielowiec-Korzeniowska et al. 2020), as noted by W&F and commentators Cao (2020) and Schuck-Paim (2020). The immune deficiency caused by physical and psychological stress, combined with the heavy microbial load, is then used to justify the massive use of antimicrobial drugs, one of the shared consequences of psychological and physical suffering (Mellor et al. 2000; Broom & Kirkden 2004; Gimsa et al. 2018). This is also a breeding ground for zoonoses. To address the effects of the stressful living conditions, various types of mutilation are also practiced -- in most cases without anaesthetic (although even anesthesia can have immunological consequences: Kona-Boun, Silim & Troncy 2005) (Aubry 2005; Prunier et al. 2005;

Sutherland et al. 2012; Gottardo et al. 2016; Jimenez et al. 2019). Moreover, such mutilations fail to address the root causes of the problem: they do nothing to alleviate the stress responsible for the aberrant behaviour; they only limit the consequences of its outward manifestations.

Perhaps the most frequently overlooked form of psychological suffering in farm environments is the distress endured in some species by mothers and their offspring because of repeated forced gestation followed by forced separation shortly after birth (Mansell et al. 2006). Separating mothers from their offspring can cause intense psychological stress in both individuals (Lay 2000, Novak et al. 2006; Newberry & Swanson 2008; Okabe et al. 2012; Mora-Medina et al. 2015; Costa et al. 2019; Relić et al. 2020). It would be a mistake to think that only human beings feel a maternal instinct and suffer from separation. Mothering is basic, instinctive behaviour in mammals as well as birds and even some lower vertebrates; it evolved well before the emergence of *Homo sapiens* (Drury et al. 2016; Davis et al. 2017; Watson & Matsuzawa 2018; Rogers & Bales 2019; Numan 2020).

As discussed in section 2 on physical suffering, transportation often also gives rise to psychological suffering (Blecha 2000; Elrom 2000a,b; Zanardi et al. 2007; White et al. 2009; Minka et al. 2010; Foster et al. 2014; Santurtun et al. 2015; Roy et al. 2015; Marques et al. 2016; Gaia-Eurogroup for Animals 2016; Rioja-Lang et al. 2019; Broom 2019). Transportation has been found to be strongly associated with stress reactions, which vary by species and environmental conditions, as indicated by various behavioural and hemato-biochemical parameters and by the condition of carcasses at slaughterhouses. Sources of psychological stress include the various phases of handling, vehicle loading and unloading (the two most stressful stages of transportation, given the contact with humans, the forced physical exertion and the new, unfamiliar environment), the crowding together of unacquainted individuals, which can lead to aggression, and the trip itself, with all the physical disturbances associated with vehicular travel (caused by driving style, vibration, noise, road quality, acceleration, deceleration, braking, turns, temperature, humidity, etc.). Finally, prolonged deprivation of food and water is sometimes a significant source of psychological stress, particularly for animals accustomed to a feeding routine (Canley 2017; Damtew et al. 2018).

The psychological suffering experienced at multiple points up to and including the slaughterhouse (Duncan 2004; Faucitano & Goumon 2018) is unmistakably expressed by, among other things, physical behaviour and vocalizations. Clearly, animals that balk at entering the corridors of death or struggle when suspended fully conscious by the hind legs, hanging upside-down on the rail that will convey them to the puncturing point, cannot be experiencing psychological well-being.

4. Conclusion. The suffering of farmed animals is multidimensional: both sensory and emotional. It varies by species, production system and geographic location, but suffering is ubiquitous throughout all stages of production — breeding, housing, transport, usage and slaughter. The inventory of psychological and physical suffering discussed in this commentary is not exhaustive. (Farm fires, for example, not discussed here, kill tens of thousands of animals every year; their agony when burned alive cannot be excluded from the catalogue of suffering inflicted on farmed animals [Humane Society International 2020; Moyer 2020].)

Improved monitoring of all facilities where farmed animals are kept — with surveillance cameras to monitor all stages and conditions of handling, whether intentionally cruel or not —

are important partial solutions that would help reduce some forms of suffering (Farm Animal Welfare Committee 2015; Harnad 2016; Tulloch et al. 2018; Fernández-Mateo & Franco-Barrera, 2020). Beyond the suffering inherent in animal farming, other factors – such as fires, accidents, disease outbreaks that cause death directly or that necessitate slaughter, and the many other types of “collateral damage” suffered by the animals used in livestock production – must also be addressed.

More broadly still, whereas reducing and ultimately eliminating animal suffering is a prime objective and major challenge for the farming industry, it is also increasingly recognized that some vertebrates, including mammals and birds, have the ability to experience positive emotions and pleasure (Balcombe 2009). This suggests that efforts to improve the welfare of farmed animals cannot be confined to “merely” minimizing or abolishing their suffering (Duncan 2004; Cooper & Wemelsfelder 2020; Dawkins 1012, 2017). Their lives need to be made not just bearable but worth living too.

It is unrealistic to imagine that all the suffering caused in farmed animals by industrial practices and human callousness can be eliminated by efforts to improve their welfare. Welfare measures (FAWC 2015) do need to be undertaken and promoted, but they must not be regarded complacently, as if they were a panacea. Let us hope that W&F’s call to phase out farmed animal production to save the human population from their mounting zoonotic threat will also save farmed animals from their mounting anthropogenic threat.

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